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Comparison of Multiple Intelligence Theory in Visual, Affective and Kinesthetic Learning Forms of Team and Individual Athletes in 13-16 Years Age Group

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ABSTRACT

Multiple intelligence theory is one of the most influential educational systems that have merged together the pedagogy and curricular methodologies. The current study aimed to compared the learning styles of students participating at team and individual levels of students in terms of multiple intelligence theory, highlighting the visual, affective and kinesthetic aspects. Adopting a quantitative research design, the study examined both primary and secondary data. The primary data was obtained from a research sample of 160 students, with 80 male and female students each, in ages of 13 and 16 years who were participating in individual and team sports. The secondary data was collected from documentation search and archives dealing with the theory of multiple intelligence and learning styles. Observation charts and athletics records were analyzed through SPSS 22 program to obtain reliability analysis, frequency and percentage values, arithmetic average values, and f test values and determine whether the students' intelligence field achievements differed according to the sports they did. The findings reveal a significant difference in the kind of sports each athlete participated in each of the intelligence aspect namely visual, affective, and bodily-kinesthetic. It was also observed that one intelligence type effective helped in developing another one as a result of application of multiple intelligence theory in their learning and curriculum. This study has the implications that when students are good in one intelligence level, they can also excel in other intelligence levels to a certain extent.

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1. Introduction

Education aims to solve the existing problems by providing suitable solutions to educational issues we live in. For this reason, most developed and developing countries do not spare any expense for restructuring their education system. The Information Communication Technology (ICT) has redefined the education giving it a different approach to meet the expectations of developments in the field of science and technology. The ICT did not bring innovation only in teaching and learning, but also affected the ability to access information, analyze, evaluate and produce new information. Recent studies carried out in the education system have brought a new perspective by the use of learning models such as project-based learning, problem-based learning, cooperative learning, brain-based learning, critical thinking, reflective thinking, lifelong learning and multiple intelligence theory.

Multiple intelligence theory is one of the most influential educational systems that have merged together the pedagogy and curricular methodologies. Propounded by Dr. Howard Gardner, a Harvard educational psychologist, this theory postulates that human intelligence is not "monolithic" but covers an entire spectrum of cognitive capacities called "intelligences". In Multiple Intelligence Theory, it is argued that the individual differences of students should be revealed and education should be given according to these differences. It has been determined that the learning and teaching process is organized based on the abilities of the students by revealing the talents and potentials of the students in the teaching based on the multiple intelligence theory, and as a result, it is aimed to reveal willing, happy individuals with active participation in the lesson. The theory claims that each person can have eight intelligence areas independently of each other and that all these intelligence areas can be developed. The eight intelligence areas of the multiple intelligence theory are listed as verbal-linguistic, logical-mathematical, musical-rhythmic, visual-spatial, internal-personal, inter-social, nature and bodily kinesthetics.

With the popularity of Multiple Intelligence Schools and Montessori, the pedagogy has been redefined. As a result, there has been an effect on the development on other intelligences like mathematical, logical and linguistic. Educational institutions and pedagogical experiment based on multiple intelligences have deeply affected the IQ centric education system and every existing curriculum. today's schools, the most important contribution that can be made for the development of children in all aspects has emerged as the discovery of their interests and abilities and directing them to an area where they will be the happiest and most competent in the future in line with their interests and abilities. This will be possible by applying the theory of multiple intelligences in education.

The Theory of Multiple Intelligences should be used in education and training for many other reasons. First and foremost, each individual student has different cat-specific features, learning types, interests, strengths and weaknesses, and ability levels. Students come to school with the desire and capacity to learn. Secondly, each student has individual learning differences. For this reason, it is necessary to teach with approaches that the individuals who come to the classroom environment cannot learn in the same way, so that all students can learn. the multiple intelligence theory proves very useful in such a situation. Thirdly, since it has been determined that most of the communication in the lesson is with the teacher if the teaching is done with traditional methods, the students talk very little in the classroom, as a result of this method, the students feel bored in the lesson

and feel alienated from the school, they cannot show their skills in any way and become passive (Vural, 2004). In multiple intelligence method, contrary to this traditional method, individual differences are taken into account in the teaching process in order to reach more students who are willing, happy, open to learning. The use of multiple intelligences in the classroom environment thus provides the teacher with a wide range of action. Here, students find the opportunity to express themselves comfortably and realize themselves, and in this way, permanent learning is provided (Güleryüz, 2004).

The current study focuses on the use of multiple intelligence system in the domain of physical education, for the obvious reason that students require cognitive, affective and psychomotor capabilities in order to succeed in any physical sport or game. Since any kind of the physical intelligence requires the use of the body, it is important to have it guided by the cognitive and psychomotor capabilities. Often teachers find it difficult to synchronize all intelligences together when explaining their own subjects. It is important that a child should be taught bodily-kinesthetic intelligence when playing football or volley ball. However, in addition to this intelligence field, it must also have spatial intelligence to predict where the ball will go. He will also need verbal and interpersonal intelligence in order to be able to argue effectively and defend his rights during the game. In other words, a child does not use a single intelligence area but more than one intelligence area while performing a sportive activity.

For this reason, it is necessary to use multiple intelligences in teams or in individual sports. The aim of the current research was therefore to determine the level of the use of multiple intelligence theory of education, the use of emotional learning and kinesthetic learning of junior athletes at both individual and team levels in the 13-16 years age group.

2. Literature Review

- *Multiple Intelligence*

The theory of multiple intelligences has two main features. The first distinguishing feature of this theory is that the individual is based on real life problem solving and obtaining a product. The second is that intelligences are plural and in complex continuous interaction with each other. In addition, according to the multiple intelligence theory, all intelligences are of the same value. Gardner defined intelligence in a new way as a result of his studies. “Intelligence is the set of abilities and skills unique to each person in order to live in the changing world and keep up with the changes” (Gardner, 2004). In addition to his researches in which he tried to understand the appearance of abilities and to determine the effect of cognitive or affective accidents, he conducted research on normal and gifted children in a study called "Project Zero" at Harvard University and followed the development of cognitive abilities (Bümen, 2002). According to the theory developed by Gardner, intelligence is a biopsychological value and has been defined as follows; (Bacanlı, 1999; Bümen, 2002); “Intelligence is the power to shape a product of one or more cultural characteristics, to solve problems.” Gardner questioned the traditional understanding of intelligence and tried to reveal that intelligence accumulates too many abilities to be explained by a single or a few factors. And he called them "intelligence fields". Each individual has different learning, problem solving and communication methods with their intelligence areas.

According to Gardner, the definition of intelligence is immediately evident with its approach from other theories. Gardner defines intelligence as follows: It is very important that we recognize and develop people's intelligences and combinations. That we are so different is due to the fact that each of us has different intelligence combinations (Kaptan, 2001). Generally, many people do not have the opportunity to develop every kind of intelligence, and almost every intelligence area may be quite low or a few types may go a long way. Intelligences work together and each indirectly contributes to the development of the other (Demirel, 2005). All types of intelligence can be used and therefore improved in producing a solution in a complex business (Gözütok, 2001).

In his book "Frameworks of the Mind," published in 1983, Gardner first proposed 7 different and universal capacities (Yavuz, 2003). These seven abilities or intelligences existed instinctively in each individual, but they got manifest in different forms in different cultures. In 1995, Nature Intelligence was accepted as the 8th intelligence. However, Gardner stated that there may be intelligences such as "Existential Intelligence" other than the types of intelligence he determined (Batman, 2000). For intelligence, Gardner has identified 8 areas that can be considered as intelligence, drawing on brain research, human development and acculturation. These are Verbal-Lingual Intelligence (words), Logic-Mathematical Intelligence (numbers), Visual-Spatial Intelligence (objects), Bodily-Kinesthetic Intelligence (body language), Affective Intelligence, Social-Interpersonal Intelligence (communication, technology), Introspective - Personal Intelligence (instinct, 6th sense) is Naturalistic Intelligence.

The current research has focused on three of these intelligences, namely (i) Visual-Spatial Intelligence; (ii) Bodily-Kinesthetic Intelligence; and (iii) Affective Intelligence. These three intelligences pertain to the pedagogical application of the multiple intelligence theory on junior athletes at both individual and team levels in the 13-16 years age group.

i. Visual-Spatial Intelligence in education

Any educational curriculum comprising Visual/Spatial Intelligence focuses on pictures and images, and tests the ability to accurately perceive the visual world and recreate one's own visual experiences. In the pedagogical and educational context, shapes, colors, forms and touch, and the ability to transform them into tangible products are required. The teaching and learning focuses on intelligence feature of sharpening emotional motor perception of students. It helps students distinguish the eye, color, shape, form, touch, depth, dimension and relations. While developing intelligence, hand-eye coordination and fine movement control help students reproduce perceived shapes and colors in various environments. Architects, sculptors, painters, decorators, gardeners and graphic designers use their spatial intelligence at the highest level (Demirel, 2000).

According to Özden (1998), students with developed visual-spatial intelligence are able to create and draw pictures in their minds. They can use colors well and read maps well. They enjoy producing in the visual arts. This type of intelligence is the ability to visualize the void. From different perspectives, it can be said that visual intelligence is the first language of the human brain. From birth, the brain thinks in images and pictures, even before associating them with words. Visual intelligence is concerned with everything we see. Every shape, pattern and design students can imagine (regular or irregular), concrete or abstract images, the full spectrum of colors and textures. These are not only in their real,

concrete, outside world (which they watch with our physical eyes), but also in the depths of their dream world, which they can see with their mind's eye (including the ability to imagine and dream what is possible in their eyes, dive into the dream world, make imaginary journeys to places in their dreams, and create and invent things that they have never done before (Gardner, 1983; Tarman, 1998; Ulgen, 1995).

On the spatial side (which can be defined as sensitivity to colors, the ability to perceive 3 dimensions, or visual intelligence), this intelligence is concerned with the placement of objects in the space/time continuum and the relationship between them. Thus, the relation of one object to another is the core of the spatial aspect of the visual/spatial form of learning. A sense of direction can also be added to this; In other words, it is knowing where you are according to the objects that fill the environment you live in and being able to reach and arrive from one place to another easily. To summarize, students who are highly developed in this type of intelligence create pictures in their minds and draw them. However, they have a good imagination, with their creativity, ability to use colors and read maps. They take pleasure in drawing, painting, sculpting and designing objects in their minds (Bümen, 2004; Demirel, 1999; Kaptan, 1998).

ii.Bodily-Kinesthetic Intelligence in education

Gardner argues that most experts in pedagogy and academicians consider the mind and the body as separate from each other, which is a wrong approach. Bodily intelligence is just not related to the whole body and hands, which enables students to control their bodily movements or manipulate physical objects but it also creates harmony between body and mind. While teaching and learning, it would be wrong to limit the development of this intelligence to those who are only students in athletics. A surgeon's fine wiggle control when performing open-heart surgery or a pilot's skill in fine-tuning the gauges reveal the development of this intelligence. The bodily intelligence domain also includes some physical abilities such as coordination, balance, strength, flexibility and speed, and some special motor skills that are developed by students to work together (Saban, 2002).

Students use bodily-kinesthetic Intelligence as the ability to express their emotions by using their body, playing a game or creating a new product (Tarman, 1998). Of all intelligence styles, bodily/kinesthetic intelligence is probably the part of our lives that we least question. Every day we do a wide variety of and complex bodily/kinesthetic tasks without even realizing it. This intelligence model is about all the movements that students can perform bodily. These include not only bodily achievements in human history, but also hitherto unrecognized innate kinetic potentials. For example, children's walking ability, the ability to acquire and develop large and small motor behaviors in any process of our development and the subtleties that we can express with facial expressions, posture and in other words 'body language'. Here we must also mention the as yet unobtrusive potentialities that contemporary researchers call the 'kinesthetic body' or the 'mental body'. This is the mental body where students acquire abilities through active mental performance to develop and strengthen the movements and functions of the physical body. Students with this type of intelligence enjoy playing sports and dancing, and are extremely successful in controlling and coordinating their hands and bodies. It is the ability to use the body extremely sensitively and effectively. People with this intelligence are those who can establish the mind and body connection very successfully (Özden, 1998).

iii.Affective Intelligence in education

Affective intelligence has its own rules and thinking structures that may not be related to other types of intelligence. It is the ability to think with sounds, notes, rhythms, recognize different sounds and produce new sounds and rhythms. It includes the capacity to recognize and use rhythmic and tonal concepts, and to be sensitive to sounds and musical instruments from the environment (Tarman, 1998). Students learn the behaviors such as making sense of the sounds in the environment, predicting the mental state of the person being spoken to, and recognizing that there is a problem from the sound of the car's engine are also abilities that do not come to mind when it comes to musical intelligence, but are an important part of it.

According to Özden (1998), students developed affective intelligence while enjoying playing musical instruments, composing and performing. People with this intelligence are adept at perceiving and recreating rhythms. They can easily catch the rhythm of a song. From a neurological perspective, affective intelligence is the first of our intelligence types to evolve.

- *Previous studies on Multiple Intelligence and Learning Styles*

There are various studies that have expressed the significance of multiple intelligence in education. Armstrong (2009), for instance, examined the effects of the theory of multiple intelligences on students' ability to read and tell time and found that lessons taught with the support of multiple intelligence theory enabled students to better understand the concept of time. Lindvall (1995) investigated the effects of multiple intelligences theory and individual learning styles on academic achievement and permanence of academic knowledge in his study on third grade primary school students and found that multiple intelligence theory strategies increased students' experiences of active participation in their own learning processes in the classroom environment, resulting in lowering their behavioral problems and increased their power of retention of learning. Greenhawk (1997) found that by making use of the theory of multiple intelligences in curriculum, students' success rate increased by 20% within a year, students began to remember information more accurately, use them more confidently in problem solving, and be more successfully in group work. They could use different strategies while answering the paper-and-pencil tests, and students who hated exams said that exams were a tool used to share information with others.

Anderson (1998) examined the effects of multiple intelligence theory, memory techniques and cooperative groups on this process in his study to increase the knowledge of foreign vocabulary of seventh and eighth grade (Latin) students and to ensure the permanence of these words. Significant differences were found between traditional and used methods in favor of the experimental group. In line with the data obtained on a weekly basis, it was concluded that there was an increase in the vocabulary of the students and this was reflected in the permanence of the words. Furnham, Fong, and Martin (1999), in their study with university students in England, Hawaii, and Singapore, found that male students perceived themselves stronger than female students in the areas of logical-mathematical, visuospatial and bodily-motor intelligence. Franzen (1999), in her study with fifth, sixth and seventh grade students, found that students perceived themselves as the strongest in social-interpersonal and naturalistic intelligence, and the weakest in

verbal-linguistic intelligence. In Chan's (2001) study with gifted Chinese students, it was seen that the verbal-linguistic intelligence domain had a statistically significant contribution to explaining the students' Chinese achievement.

Bednar et al. (2002) investigated the effects of multiple intelligences theory on the motivation and academic achievement of students in mathematics lessons. Students found education and learning more meaningfully with the application of the theory of multiple intelligences and resulting in a great increase in the motivation and success of the students regarding the mathematics course. Sharifi (2008) stated that there is a significant relationship between different intelligence types and school field scores; that the most disagreement in terms of success in education can be explained by verbal-linguistic and mathematical-logic intelligence; It revealed that intelligences are not completely independent and that there are low but significant relationships between some of them. Kaur and Chhikara (2008) determined multiple intelligence levels among 200 adolescents aged 12-14 years and investigated gender differences according to intelligence levels. The results of the study revealed that the level of the participants was above average for all intelligence types. It was observed that there were significant differences between the averages of girls and boys for verbal, logical, musical and bodily intelligences. In addition, it was found that girls were ahead in verbal and musical intelligence, and boys in logic and physical intelligence by a small margin.

Keefe states that learning style studies first emerged in 1892 and most of the studies were seen after 1940 (Cited by Lemire (1996)). In the study conducted by Reid (1987), it was found that the majority of Korean, Chinese and Japanese students were visual learners, they were unsuccessful only in verbal lessons and were not supported by any visual materials, and Korean students in particular showed a high preference for this learning style. Leiden, Crosby, and Follmer (1990), in their study on 79 students studying at Nevada University School of Medicine; They compared the students' scores from the study inventory and learning processes inventory with their academic achievement scores in the two branches and found that the correlation between learning style and academic achievement was very low. Therefore, they concluded that students' learning styles cannot be a determinant of their academic success. Dunn et al. (1990) investigated the effect of learning styles on student achievement and attitudes. As a result of the research, it was determined that the students who prefer to learn alone in the situation of learning alone are more successful; It has been determined that students who prefer to learn with their friends are more successful in the case of learning with their friends. In addition, they concluded that students who prefer their own learning situations develop more positive attitudes.

A study was conducted by Ewing and Yong (1992) to examine whether there is a difference in learning styles of 6th and 8th grade Chinese, African and Mexican-American minority students according to their gender and grade. As a result of the research, it was seen that there were significant differences according to gender in the students' preference for receiving information and their tactile preferences. It has been determined that students of African descent have a preference for afternoon work and visual learning style, while students of Mexican descent have a preference for kinesthetic learning style. In general, it was observed that these three groups predominantly preferred visual learning style. Cropper (1994) tried to reveal the learning styles of gifted students in his study on teaching

for different learning styles. As a result of the study conducted on 137 gifted students at high school level, it was found that students have different learning styles such as language, auditory, numerical, tactile, personal learning, group learning, verbal comprehension and written comprehension.

Thomson and Mascazine (1997), in their study, which is a literature review on learning styles research, stated that everyone has a learning style, regardless of how they interact with others and how they learn. Thomson and Mascazine argue that the greatest benefit of considering learning styles, especially in mathematics and science education; They state that students gain the responsibility of self-learning. They also state that learning will increase if teachers take into account the learning styles of their students while determining their teaching strategies. Shih et al. (1998) aimed to determine the characteristics of students' learning styles and which learning strategies they use in learning and to reveal the relationship between students' success and learning strategies and learning styles. It has been determined that students have more visual and auditory learning features, and they use remembering and cognition strategies intensively. The study conducted by Poon Teng Fatt and Teng Joo (2001) examined the learning styles of design and technology education students. In this study, learning types of secondary school students from Singapore were examined. According to the results of the research, it was seen that the students preferred the ways of learning by doing and predominantly adopted the kinesthetic learning type preferences, followed by the auditory and visual preferences.

In the study conducted by Wood (2002) with students from the third to the sixth grade, he divided the student groups into two equal parts. After an appropriate teaching based on learning styles was given to one of these groups, the next day, the subject of fractions was taught with traditional teaching methods and techniques. On the other hand, the opposite instruction was applied to the other group. On the first day, a subject in geometry was covered with traditional teaching methods and techniques, while on the second day, fractions were taught in accordance with learning styles. According to the results of the research, the success scores of the students who were taught based on learning styles were found to be significantly higher. Dee et al. (2002) conducted a study on medical engineering students at Tulane University in the United States to determine the learning styles of students, while 88% of medical engineering students remember visual information, while 55% remember information aurally. In addition, 66% of the students assimilate the information with activities, 59% of them reach the information holistically. In the study, it was also observed that female students made the knowledge more permanent by actively participating in the studies.

Saban (2003) examined the learning style preferences of students attending the introductory psychology course. In this context, it was analyzed and interpreted whether the students in question were aware of their own learning styles and whether this had an impact on their performance in the classroom. This study focused on visual, auditory and kinesthetic or any combination of these three factors. The results supported the view that learning style preferences may not have an effect on a student's grade, but if students are educated in accordance with their own learning styles, students feel that they learn more efficiently and show a more positive approach to education. In another study by Loo (2004), the relationship between Kolb learning styles and learning preferences was examined. The

data of the study conducted on 201 undergraduate students, 113 male and 88 female, were collected with the learning styles inventory developed by Kolb (1985). According to the findings of the research; It has been stated that there is a statistically significant difference between the fact that students with a converging learning style prefer group work more than students with a learning style that absorbs group work, and that students with a divergent learning style prefer practical exercises more than students with a learning style that assimilates them.

Garland and Martin (2005), in their research, determined that gender is an important factor in determining students' learning style preferences. The Myers-Brigg Type Indicator Inventory was used as a data collection tool in the research named "Determination of Learning Styles of People of Different Ages and Ethnic-Cultural Identities" by Puyleart (2006). The research was carried out on nursing students and the learning styles of the students were determined and analyzed according to age. In the research, Carl Jung's theory of personality was used as the theoretical framework. As a result of the research, it was determined that the average age of 50 students was 23.5 and they had 3 types of intermediate learning preferences.

The aforesaid studies have not made any attempt to make a comparison between the theory of multiple intelligences and learning styles of athletes between the ages of 13 and 16 at team or individual levels. The current study aimed to fill this gap in this area.

3. Methodology

- *Research design*

A quantitative research design was used for this study as it dealt with calculating the intelligence levels of students after the introduction of multiple intelligence theory. Being a comparative study, the quantitative method was more relevant. The study examined the information collected from documentation search about the theory of multiple intelligences and the theory of learning styles for making a comparison. This comparison was then applied to the primary data collected from athletes in the age group of 13 years and 16 years at both team and individual level sports.

- *Sample*

The research sample consisted of 80 make and 80 female students between the ages of 13 and 16 years who were participating in individual and team sports. Out of the total 160 participants, 100 of participated in team sports and 60 in individual sports. In the team group, 40 participants played football, 30 played basketball and 30 played hand ball. In the individual group, 20 participants played fencing, 20 played different types of athletics and 20 played swimming.

- *Data Collection*

Observation was the main source of data collection. This data was collected on different intelligence areas namely visual-spatial, affective and bodily kinesthetics onto observation charts for each participant. In addition, the athlete observation form were also filled by the physical education teachers, which was also a good source to measure their intelligence scores and compare the learning styles of the students and their achievements

- *Data analysis*

The data collected underwent various analyses including reliability analysis, frequency and Percentage Values, Arithmetic Average Values, and F Test Values to determine whether the students' intelligence field achievements differed according to the sports they did. The SPSS 22 package program was used to carry out these analyses.

4. Findings and Results

Reliability values were found to be 0.987 for visual intelligence, 0.993 for affective intelligence and 0.968 for bodily kinesthetic intelligence, as revealed in Table 1. This indicates the data was reliable and trustworthy, and the opinion expressed by the participants were unbiased and free from any prejudice.

Table 1

Confidence values by field types

Field Type	Number of Items	Cronbach's Alpha Value
Visual-Spatial	5	0.987
Affective	5	0.993
Bodily Kinesthetics	5	0.968

Table 2

Frequency and percentage values showing the distribution of branch status of the sample athletes

Sport	Frequency (f)	Percentage (%)
Football	40	25%
Basketball	30	18.75%
Handball	30	18.75%
Fencing	20	12.5%
Athletics	20	12.5%
Swimming	20	12.5%
Total	160	100%

As seen in Table 2, 25% of the athletes participating in the research played football, 18.75% basketball, 18.75% handball, 12.5% fencing, 12.5% athletics, and 12.5% seen doing swimming sports.

Table 3

Arithmetic average values of the athletes participating in the research showing their success in sports

Sport	Mean	N	Standard Deviation
Football	2.8798	40	0.7336
Basketball	3.4598	30	0.5789
Handball	2.9786	30	0.6987
Fencing	2.5467	20	0.6987
Athletics	2.9789	20	0.6834
Swimming	2.8793	20	0.6549
Total	2.9538	160	0.6879

Table 3 presents the success of the athletes in their respective fields as was examined after introducing the multiple intelligence in their teaching and learning as well as making them a part of their curriculum. The average score measured was 2.8798 for football players, 3.4598 for basketball players, 2.9786 for handball players, 2.5467 for fencing, 2.9789 for athletics, and 2.8793 for swimming athletes.

Table 4

F-test values measuring whether visual success of athletes is different according to their levels of sports

Image	N	Mean	Standard Deviation	S.D.	F	Significance(p)
Football	40	2.9234	0.7606			
Basketball	30	3.2345	0.6987			
Handball	30	3.4565	0.7856	159	24.987	0.000
Fencing	20	3.2312	0.7845			
Athletics	20	2.4568	0.4567			
Swimming	20	2.9874	0.6798			
Total	160	3.0483	0.7434			

Table 4 presents F-test values measuring whether visual success of athletes is different according to their levels of sports. The minimum Mean was observed in athletics (M= 2.4568; SD= 0.4567) and maximum was measured in handball (M=3.4565; SD=0.7856).

Based on the data obtained, the following two hypotheses for visual achievements were framed:

- *H0: The visual achievements of the athletes do not show a significant difference according to their success in the sport they have done.*
- *H1: The visual achievements of the athletes show a significant difference according to their success in the sport they have done.*

H0 Hypothesis was rejected since the value in the significance column is $p = 0.000 < 0$ according to the result of the F Test seen in Table 4, which was performed at 95% confidence level and with $\alpha = 0.05$ significance. In other words, the visual achievements of the athletes show a significant difference according to their success in the sport they have done. This situation shows that there is a relationship between the visual success of the athletes and the sports they do. Before children start a sport, their visual success can be tested and it can be determined whether they will be successful in the sport they have done. Hence H1 was accepted.

Table 5

F Test values measuring athletes' affective achievements according to their sport levels

Image	N	Mean	Standard Deviation	S.D.	F	Significance(p)
Football	40	2.7898	0.7456			
Basketball	30	2.4513	0.8234			
Handball	30	2.7654	0.7898	159	23.456	0.000
Fencing	20	2.5645	0.8767			
Athletics	20	3.2345	0.4565			
Swimming	20	3.4576	0.6876			
Total	160	2.8771	0.7923			

Table 5 presents the F Test values measuring athletes' affective achievements according to their sport levels. The minimum Mean was observed in basketball (M= 2.4513; SD= 0.8234) and maximum was measured in Swimming (M=3.4576; SD=0.7923). Based on the data obtained, the following two hypotheses for affective achievements were framed:

- ***H0:*** *The affective achievements of the athletes do not show a significant difference according to their success in the sport they have done.*
- ***H1:*** *The affective achievements of the athletes show a significant difference according to their* success in the sport they have done.

H0 Hypothesis was rejected since the value in the significance column is p = 0.000 < 0 according to the result of the F Test seen in Table 5, which was performed at 95% confidence level and with α = 0.05 significance. In other words, the affective achievements of the athletes show a significant difference according to their success in the sport they have done. It is seen that the affective success of children is related to the sports they do. Students can be more successful in this sport by determining the sport they will do according to their emotional success. Hence H1 was accepted.

Table 6

F test values measuring whether physical achievement of athletes is different according to their sport levels

Image	N	Mean	Standard Deviation	S.D.	F	Significance(p)
Football	40	2.5467	0.7345			
Basketball	30	2.6798	0.8456			
Handball	30	2.7634	0.6547	159	28.983	0.000
Fencing	20	2.4565	0.7612			
Athletics	20	3.1234	0.4356			
Swimming	20	3.4576	0.7456			
Total	160	2.8379	0.8323			

Table 6 presents the F Test values measuring athletes' bodily-kinesthetic achievements according to their sport levels. The minimum Mean was observed in athletics (M= 2.4568; SD= 0.4567) and maximum was measured in handball (M=3.4565; SD=0.7856).

Based on the data obtained, the following two hypotheses for bodily-kinesthetic achievements were framed:

- ***H0:*** *The bodily-kinesthetic achievements of the athletes do not show a significant difference according to their success in the sport they have done.*
- ***H1:*** *The bodily-kinesthetic achievements of the athletes show a significant difference according to their success in the sport they have done.*

H0 Hypothesis was rejected since the value in the significance column is p = 0.000 < 0 according to the result of the F Test seen in Table 6, which was performed at 95% confidence level and with α = 0.05 significance. In other words, the physical achievements of the athletes show a significant difference according to their success in the sport they have done. According to this situation, it is seen that the physical success of the students increases according to the suitability of the sports they do. Hence H1 was accepted.

5. Discussion

It is evident from this study that if certain types of intelligence affect success in certain sports, there is a direct proportional increase between the intelligence levels and sports success. Several types of intelligence affect success in a sport. For this reason, in the sports education given to the children, the learning styles of the children were determined with

the theory of multiple intelligences and the success of the children in the sports they did was examined. These theories should be taken into account in the sports education given to children. For each education, especially the education styles to be given to children and the theories of multiple intelligences should be examined and interpreted, and students should be prepared for sports in this way.

Much of the findings of this study are consistent with past studies. For instance, Kocabaş (2003) conducted research on 46 pre-school teacher candidates studying at Dokuz Eylül University Education Faculty Preschool Teaching Department. No significant difference was found between musical rhythmic intelligence areas based on genders; except one difference was found between the social intelligence of the athletes who actively do sports. This suggested that both male and female students worked in harmony and communicated effectively verbally and non-verbally with other individuals. In another study, Tekin (2007) also found no significant difference between the social intelligence areas according to the gender variable in but found that multiple intelligence areas of pre-service teachers studying at physical education and sports schools do have a significant difference based on variables.

Hoşgörür and Katrancı (2007) concluded that there was no significant difference between the social intelligence areas of both male and female students in the study when they examined the dominant intelligence areas of Physical Education and Sports Teaching. These results also revealed that there was no significant difference between the ability of both male and female students to understand their own emotions, measure their reaction levels, determine their thinking processes, and set goals for themselves. It is thought that the reason why this difference does not occur is due to the high level of individual work activities.

Bayrak, Çeliksoy, and Çeliksoy (2005) also found no significant difference between intrapersonal intelligence domains according to genders in the domain of physical education and sports school students' intelligence profiles related to multiple intelligence theory and its relationship with the applied talent entrance exams. There was also no significant difference between the naturalist intelligence areas of the students who do sports. According to these results, it is seen that both male and female students have the awareness of creating a healthy environment. Likewise, Chan (2003) also found no significant difference between the naturalist intelligence field according to the genders. Cengiz (2008) examined the distribution of multiple intelligence types of children aged 8-10 years and the effect of football education on multiple intelligence levels. Göde, Mavioğlu, and Erturan (2007) examined the relationship between the assist-paste preferences of children playing football and their multiple intelligence areas are examined. If it was handled not only in team sports but also in branches related to individual sports, the probability of difference would be high.

Tekin (2007) examined the multiple intelligence areas of pre-service teachers studying at physical education and sports schools and found no significant difference between the verbal linguistic intelligence areas or the logical-mathematical intelligence areas of students who do both individual and team sports. Similar findings were evident in Cengiz (2008), who examined the distribution of multiple intelligence types of 8–10-year-old children and the effect of football education on multiple intelligence levels. Bozkurt (2004) examined the relationship between creativity and multiple intelligences in football, but no

significant difference was found between the visual-spatial intelligence areas of the football players playing in the star and youth team of Galatasaray sports club. Göde et al. (2007) examined the relationship between assist-paste preferences of children playing football and multiple intelligence domains, no significant difference was found between children's visual-spatial intelligence domains. Similarly, İlhan et al. (2005) examined the effects of gymnastics and volleyball units, which are processed in line with multiple intelligence practices, on the cognitive and psychomotor development of students, a significant difference was found according to bodily kinesthetic intelligence areas.

Erturan, Dündar, and Yapıcı (2005) compared the intelligence areas of primary school students and their sports fitness and found a significant relationship between bodily kinesthetic intelligence and sports fitness levels. Cengiz (2008) examined the distribution of multiple intelligence types of 8-10 year old children and the effect of football education on multiple intelligence levels, a significant difference emerged between the physical kinesthetic intelligence areas of children. Because of these studies; It is thought that it is due to the fact that it is done in different sample groups and the group is different in terms of cognitive and psychomotor domains. The social and intrapersonal intelligence areas of the athletes engaged in individual sports were higher than the athletes engaged in team sports.

6. Conclusion

The results of the study can be summarized as follows: the visual achievements of the athletes show a significant difference according to their success in the sport they have done; the affective achievements of the athletes show a significant difference according to their success in the sport they have done; and the bodily-kinesthetic achievements of the athletes show a significant difference according to their success in the sport they have done. It was also determined that more than one intelligence type is effective in the success of the athletes in individual and team sports. For this reason, even if students are in a very good situation at one intelligence level, they can also contain different intelligence levels to a certain extent. This positively affects the success of the athletes in their sports.

Sports and intelligence should not be considered independently of each other. No matter how hard an athlete trains, if he does not use his intelligence, he will not be completely successful. In training, we can consider not only physical activity but also intelligence as a whole with physical activities. We can combine technical work with powerful and clever tactics. An athlete should be able to anticipate the next move like a chess player and think about his own move accordingly. Each person's intelligence level differs. By determining the intelligence areas of the athletes, training programs can be applied in which they can express themselves better. Trainers who are experts in their fields in each branch can create certain resurrections related to the eight intelligence areas and have them work. In future studies, analyzes can be made by comparing multiple intelligence levels on individuals who do and do not do sports, and they can be supported by qualitative data analysis by conducting interviews with athletes. When studies are carried out in this way, if the results are shared with the athletes, the interest and work of the athletes is increased. Similar studies can be conducted with more branches and athletes. If the field of multiple intelligences is introduced in schools and teachers are informed, a more conscious and personalized education can be implemented.

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